Avoidable high-risk fertility among West African women: Any progress and prospect for decline?

Introduction

High-risk fertility plays a major role in high maternal and infant mortality statistics, yet it is under-researched in West Africa. Avoidable risks involves too short or too long inter-birth intervals - below 33 or above 75 months after a previous birth (WHO, 2005) or inter-pregnancy intervals – below 18 or above 59 months after a preceding birth (Conde-Agudelo, Rosas-Bermudez, & Kafury-Goeta, 2006). It also involves high multiparous births (birth after 3 or more previous births), births at a very young age (below 18 years) and births at older age (35 years or older) (Rutstein, 2005; Abedin & Rahman, 2012). The unavoidable risk involves a woman's first birth. High-risk fertility does not only increase women's risk of perinatal morbidity and maternal mortality, it also contributes to high infant and child mortality rates in developing countries (Abedin & Rahman, 2012). It is one of the factors accounting for higher maternal and child mortality in sub-Saharan Africa (SSA) compared to other regions.

For instance, Africa takes the largest share of the maternal mortality ratio (542 per 100,000 live births) recorded in developing countries (239 per 100,000 live births) which is higher compared to the developed countries (12 per 100,000 live births) (Alkema et al., 2016); WHO, 2018). The statistics is exceptional in West Africa, including Sierra Leone, Nigeria and Liberia with 1360, 814 and 725 deaths per 100,000 live births respectively are among the largest (WHO, 2015). Similarly, SSA alone accounted for 38 percent of the global neonatal deaths in 2016 (United Nations IGME, 2017). Of the infant death statistics in SSA, West Africa's (71 per 1,000 livebirths) is the highest after Middle Africa (79) compared to the Eastern and Southern Africa – 40 and 53 per 1,000 live births respectively (United Nations, 2015). Though several interrelated factors may have accounted for these rates, high-risk birth is key.

Available evidence has substantiated that high-risk fertility impacts maternal and child mortality. In Bangladesh for instance, Barkat and Majid (2003) observed that infant mortality rate to adolescent mothers (106 per 1,000 live births) was higher compared to older mothers (79 deaths per 1,000 live births). Similarly, Rochebrochard and Thonneau (2002) in Europe and Reddy et al. (2006) in the United States also found that births to women aged 35 and above were associated with increased risk of miscarriage and stillbirths. Evidence from other contexts also supported that risk of stillbirth, perinatal mortality and infant or under-five mortality was higher for children with 3 or more prior siblings and too short or too long birth intervals to the preceding birth (Alam, 1995; DaVanzo, Hale, Razzaque, & Rahman, 2008; Mostafa, Foster, & Fauveau, 1995; Mozumder, Barkat-e-Khuda, & Kane, 1998; Rutstein, 2005; Rutstein, 2008). Despite this evidence, the periodic level of high-risk fertility of women in SSA, especially West Africa is poorly understood and require empirical investigation. This is necessary for appraising the progress in combating and prospect for abating high maternal and child mortality in the sub-region.

Though studies have associated high-risk fertility to low contraceptive prevalence (Akinyemi et al., 2015; Guzzo & Hayford, 2011), educational attainment, experience of child mortality or pregnancy loss and accessibility and utilization of healthcare services (Gurmu & Dejene, 2017), the studies are sparsely, outside West Africa and yet to explore the proportion at risk periodically. Periodic examination, for instance, in a 5-year period is essential for monitoring progress and impacts of intervention efforts. Also, the role of preferred family size, age at marriage and partner's level of education on high-risk births have been neglected in most studies. Though ongoing efforts to increase contraceptive use, female education and provide healthcare facilities in the West Africa, it is not clear what impact the changes have made on high-risk fertility among women of childbearing age in the sub-region. This study therefore investigated 5-year high-risk fertility and associated factors among reproductive age women in West Africa.

Methods

Sample Design

The study entailed a secondary analysis of the two most recent Demographic and Health Survey (DHS) of some West African countries whose most recent DHS is not older than five years. The DHSs used and their years of collection are women's dataset of Ghana (2008 and 2014), Liberia (2007 and 2013), Nigeria (2008 and 2013), Senegal (2010 and 2014), Sierra Leone (2008 and 2013) and Togo (1998 and 2013/14).

The DHS datasets are nationally representative data with demographic and health information about women of reproductive ages 15–49 years across each country. The sampled households were based on clusters, known as primary sampling units (PSU). The clusters were based on the enumeration areas of each country. The samples were selected using two-stage stratified cluster design. The details of the sample design and data collection methods for each country were published elsewhere (ref too long, removed). Eligible respondents for this study were women of childbearing age who had had at least one birth in the last five years preceding each survey. Weighted total samples of 46,983 and 39,995 were extracted from the dataset of the most recent and preceding surveys respectively and analyzed to achieve the objectives of this study.

Variables measurements

In this study, the outcome variable is avoidable high-risk birth which will be computed from other variables such as number of births, age at birth and birth intervals in the last 5 years preceding the survey. The number of births is the number of deliveries a woman had within the last five years, taking twin births as single birth. Also, birth interval is the interval between two successive live births. Women who have experienced any high-risk birth at any time within the last five years preceding the survey are coded one (1), otherwise zero (0). This scoring was applied to four high-risk births: having your fifth birth, more than two births, birth at age below 18 or at age 35 and above, birth interval of below 33 or over 75 months at any time within the last 5 years preceding each survey. Each of the high-risk births are summed up as a composite score to arrive at the outcome variable. All women who previously had high-risk birth prior to the last 5-year date or who had their first birth within the 5-year period (unavoidable high-risk birth) were excluded from this study.

Guided by reviewed literature, the explanatory variables were respondent's current contraceptive use, age at marriage, ideal number of children, age, education, residence, wealth quintile, religion, husband's age and education. For ease of interpretation and clarity of associations, some variables were collapsed including level of education as: none/primary and secondary/higher education; religion as: Christianity, Islam and others; current contraceptive use as: users and non-users. For numeric explanatory variables such as respondents' age, age at marriage, ideal number of children and partners' age, centred-values were used. The centred-values were obtained by subtracting the mean value from individual values in each variable. The difference, called centred-value, categorizes the respondents into two: those with mean value or higher and those below mean value.

Statistical Analysis

Univariate analyses of the socio-demographic characteristics and persons having high-risk births in the last five years preceding each survey were done using percentage distribution. These were done on country basis. For multi-variable analysis, multiple regression was used to examine the factors associated with high-risk births among women in the last five years preceding the two surveys. All analyses were carried out using Stata software (version 15.0) and statistical significance determined at 95% confidence level. All data were merged during multivariate analyses. All analyses were based on weighted sample and excluded missing values.

Results

The result in Table 1 revealed that within the average period of 10 years, proportion of West African women experiencing high-risk birth remains high without any significant decline. About 65 – 66% of the women still had at least one high-risk birth out of which 25% were multiple risks. Though not up to expectation, the proportion of women having the risk slightly declined in three of the selected countries by 2.2 – 7.5% including Liberia (from 64% to 62%), Nigeria (from 71% to 70%) and Togo (from 61% to 57%). Conversely, in other three countries, instead of decline, the proportion of women having at least one high-risk birth slightly increased by 4.1 – 7.7% within the 5 years preceding each survey, including Ghana (from 56% to 59%), Senegal (from 60% to 65%) and Sierra Leone

(from 63% to 65%). Out of the proportions with at least one risk, more than 20% had multiple high-risk births in the two surveys across the selected countries, except Togo (19% in 2013/14 survey). This result generally has implication for persistent high maternal and child mortality in West Africa.

In Table 2, the result of the multiple regression analysis of the baseline survey (the survey preceding the most recent) indicated that living in Ghana, Liberia, Senegal, Sierra Leone and Togo reduces the experience of high-risk births by 0.204, 0.054, 0.101, 0.196 and 0.245 respectively ($p<0.001$) compared to living in Nigeria. Also, attaining a minimum of secondary/higher education by women lowers high-risk births by 0.112, all other factors held constant. A similar relationships apply to wealth quintile, partners' educational level, age at marriage and contraceptive use. For instance, being in richer and richest wealth quintile reduces high-risk birth by 0.056 and 0.067 respectively. Marrying at older age above the mean age at marriage (17.7 years) reduces high-risk birth among women by 0.026; using contraceptives by 0.038; and husband/partner having a minimum of secondary/higher education by 0.068 lowers high-risk births among West African women, other factors remaining at reference category.

On the other hand, in the same baseline survey, some factors rather increased the experience of high-risk births significantly ($p<0.05$) in the sub-region, including women's current age, rural residence and other religions. Women being older than the mean age (29.3 years) by 0.041, rural residence by 0.049 and being in other religious groups (traditional, animist, no religion, etc) by 0.085 increased high-risk birth of women in the sub-region.

These relationships were consistent in the follow-up (the most recent) survey, except few. For instance, rural residence no longer had significant influence on high-risk birth in the follow-up survey. On the other hand, being in middle wealth quintile and having more than the mean ideal number of children became important factors influencing high-risk births among women ($p<0.05$). while being in middle wealth quintile reduces high-risk birth by 0.057, having more than average ideal number of children (9 children) increased high-risk birth by 0.002, holding other factors at reference category level.

Conclusion

The findings suggest the need for more intense focus on abating high-risk fertility in West African countries. There is need for increasing the tempo of women empowerment in West African sub-region. The current tempo is not sufficient to abate the region's vulnerability to high maternal and child deaths. It also suggests the need for men's involvement in contraceptive choices and effort in order to increase contraceptive prevalence rate in the region.

Table 1: Changes in proportion of women with high-risk pregnancies in West Africa using two successive surveys

Country	Survey period	>2 births in the last 5 years	% having 5th or higher birth within the 5-year	births at age <18 or >34 years in the last 5 years	Birth interval <33 or >75 months	Single risk	Multiple risks	At least one risk	Totals with at least one birth in last 5 years
West Africa	Baseline	6.5	15.7	27.6	48.1	40.6	25.7	66.3	39,995
	Follow-p	5.5	15.3	27.7	46.5	40.8	24.5	65.3	46,983
	Change (%)	-15.4	-2.5	0.4	-3.3	0.5	-4.7	-1.5	
Ghana	2008	3.8	12.6	26.2	39.7	36.2	20.2	56.4	2,099
	2014	4.0	13.4	27.1	39.7	37.8	20.9	58.7	4,142
	Change (%)	5.3	6.3	3.4	0.0	4.4	3.5	4.1	
Liberia	2007	5.3	14.0	29.2	44.2	39.9	23.8	63.7	3,928
	2013	3.7	12.7	28.9	41.5	41.7	20.6	62.3	4,770
	Change (%)	-30.2	-9.3	-1.0	-6.1	4.5	-13.4	-2.2	
Nigeria	2008	8.2	16.5	28.7	53.6	41.7	29.3	71.0	17,635
	2013	7.1	16.3	28.4	52.1	41.4	28.2	69.6	20,467
	Change (%)	-13.4	-1.2	-1.0	-2.8	-0.7	-3.8	-2.0	
Senegal	2010	6.0	15.9	26.8	46.3	39.9	20.2	60.1	7,690
	2014	6.3	14.7	26.6	47.8	40.0	24.7	64.7	4,100
	Change (%)	5.0	-7.5	-0.7	3.2	0.3	22.3	7.7	

Sierra Leone	2008	4.6	15.0	26.1	43.9	40.9	21.7	62.6	4,103
	2013	4.2	16.0	28.9	44.0	42.3	23.0	65.3	8,647
	Change (%)	-8.7	6.7	10.7	0.2	3.4	6.0	4.3	
Togo	1998	4.8	16.2	25.4	59.2	39.6	21.5	61.1	4,539
	2013/14	3.7	14.4	23.6	37.4	37.6	18.9	56.5	4,858
	Change (%)	-22.9	-11.1	-7.1	-36.8	-5.1	-12.1	-7.5	

Note: negative sign indicates decline in proportion with high-risk pregnancy while positive sign indicates increase in the proportion

Table 2 Factors accounting for high-risk births among West African women

	Baseline survey			Follow-up survey		
	Coeff.	Std. Err.	95% C.I.	Coeff.	Std. Err.	95% C.I.
Country						
Nigeria [rf]	-	-	-	-	-	-
Ghana	-0.2043***	0.02126	-0.2459 – -0.1626	-0.2050***	0.01559	-0.2355 – -0.1744
Liberia	-0.0540**	0.01841	-0.0901 – -0.0179	-0.0749***	0.01558	-0.1054 – -0.0444
Senegal	-0.1014***	0.01440	-0.1296 – -0.0733	-0.0791***	0.01643	-0.1113 – 0.0469
Sierra Leone	-0.1959***	0.01680	-0.2288 – -0.1629	-0.1137***	0.01212	-0.1375 – -0.0899
Togo	-0.2453***	0.01811	-0.2808 – -0.2098	-0.2682***	0.01532	-0.2983 – -0.2382
Age (years)						
Centered age [a] (mean=29.3)	0.0413***	0.00090	0.0395 – 0.0430	0.0442***	0.00083	0.0426 – 0.0459
Educational level						
None/primary [rf]	-	-	-	-	-	-
Secondary/higher	-0.1115***	0.01441	-0.1398 – -0.0833	-0.0878***	0.01219	-0.1117 – -0.0639
Residence						
Urban residence [rf]	-	-	-	-	-	-
Rural residence	0.0494***	0.01098	0.0279 – 0.0709	0.0211	0.01147	-0.0014 – 0.0435
Wealth quintile						
Poorest [rf]	-	-	-	-	-	-
Poorer	0.0241	0.01346	-0.0033 – -0.0515	0.0013	0.01180	-0.0218 – 0.0244
Middle	-0.0099	0.01568	-0.0401 – 0.0202	-0.0567***	0.01299	-0.0822 – -0.0313
Richer	-0.0561**	0.01787	-0.0911 – -0.0210	-0.0963***	0.01543	-0.1265 – -0.0660
Richest	-0.0667**	0.02211	-0.1101 – -0.0234	-0.1382***	0.01895	-0.1754 – -0.1011
Religion						
Christianity [rf]	-	-	-	-	-	-
Islam	0.0050	0.01254	-0.0196 – 0.0295	-0.0190	0.01075	-0.0401 – 0.0021
Others	0.0851***	0.02089	0.0442 – 0.0.1260	0.0702**	0.02066	0.0297 – 0. 1107
Ideal number of children						
Centered ideal no. of children [a] (mean=9.4)	0.0001	0.00027	-0.0004 – -0.0007	0.0023***	0.00063	0.0011 – 0.0036
Age at marriage						
Centered age @ marriage [a] (mean=17.7)	-0.0260***	0.00123	-0.0284 – -0.0236	-0.0218***	0.00111	-0.0240 – -0.0196
Current contraceptive use						
Not using [rf]	-	-	-	-	-	-
Using	-0.0375**	0.01320	-0.0635 – -0.0114	-0.0336**	0.01078	-0.0547 – -0.0125
Husband/Partner's age (years)						
Centered age [a] (mean=39.8)	0.0008	0.00060	-0.0004 – -0.0020	0.0003	0.00057	-0.0008 – 0.0014
Husband/Partner's education						
None/Primary [rf]	-	-	-	-	-	-
Secondary/Higher	-0.0678***	0.01195	-0.0913 – -0.0444	-0.0313**	0.01057	0.0521 – -0.0106
F-Statistic		344.02			386.52	
p-value		<0.001			<0.001	
R-squared		0.1387			0.1594	
Adjusted R-Squared		0.1383			0.1590	

* p<0.05; ** p<0.01; *** p<0.001; a - coefficient for persons above the mean value which is to be compared with those below the mean; rf – reference category